

Claims

1, A paper quality improver for papermaking,
 which is internally added before or in papermaking step;
 5 and
 which comprises a compound
 having lyotropic degree defined below of not less
 than 4%,
 which provides at least two of any efficiencies
 10 selected from the following paper quality improving
 efficiencies (i) to (iii):
 (i) standard improved bulky value of at least 0.02 g/cm³,
 (ii) standard improved brightness of at least 0.5 point,
 and
 15 (iii) standard improved opacity of at least 0.5 point;
 and

$$\text{lyotropic degree (\%)} = (\alpha_0 - \alpha) / \alpha_0 \times 100$$
 wherein α : the water content in a wet sheet obtained by
 adding 5 parts by weight of the compound which is the
 20 paper quality improver for the papermaking to 100 parts by
 weight of pulp and
 subjecting the resultant to the papermaking; and
 α_0 : the water content in a wet sheet obtained by
 subjecting the pulp to the papermaking without adding

the compound which is the paper quality improver for the papermaking to the pulp.

2, The paper quality improver for papermaking as claimed
5 in Claim 1, wherein the compound is selected from the group consisting of (A) organosiloxane, (B) glyceryl ether, (C) amide, (D) amine, (E) acid salt of amine, (F) quaternary ammonium salt, (G) imidazol, (H) ester of polyhydric alcohol and fatty acid and (I) alkylene oxide-added ester being an ester
10 derived from polyhydric alcohol and fatty acid and having from more 0 mole to less 12 moles on average of C_{2-4} alkylene oxide group per 1 mole of the ester.

3, A paper quality improver composition for papermaking,
15 which comprises the paper quality improver for papermaking claimed in Claim 1 and further comprises at least one compound selected from (a) anionic surfactant and (b) cationic surfactant.

20 4, A bulky value improver for papermaking, which comprises the compound as defined in Claim 1.

5, A brightness improver for papermaking, which comprises the compound as defined in Claim 1.

6, An opacity improver for papermaking, which comprises
the compound as defined in Claim 1.

7, A method for producing a pulp sheet, wherein the paper
quality improver for papermaking as defined in Claim 1 is added
at anytime before or in papermaking step.

8, A method for producing a pulp sheet, wherein the paper
quality improver for papermaking as defined in Claim 1 and an
agent for promoting to fix the paper quality improver for
papermaking onto the pulp sheet are added at anytime before
or in papermaking step.

9, A pulp sheet produced by adding the paper quality
improver for papermaking as defined in Claim 1 at anytime before
or in papermaking step.

10, A method for producing a pulp sheet, modified to satisfy
at least two of any ones selected from the following (1) to
(3), which comprises:

adding internally a compound having lyotropic degree
defined below of not less than 4% before or in papermaking step
into pulp slurry, and

subjecting the resultant to the papermaking:

$$\text{lyotropic degree (\%)} = (\alpha_0 - \alpha) / \alpha_0 \times 100$$

wherein α : the water content in a wet sheet obtained by
 adding 5 parts by weight of the compound which is the
 5 paper quality improver for the papermaking to 100 parts by
 weight of pulp and

subjecting the resultant to the papermaking; and

α_0 : the water content in a wet sheet obtained by
 subjecting pulp to the papermaking without adding the compound
 10 which is the paper quality improver for the papermaking to the
 pulp;

- (1) improved bulky value of at least 0.02 g/cm³,
- (2) improved brightness of at least 0.5 point, and
- (3) improved opacity of at least 0.5 point.

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11, A method for modifying a pulp sheet, which comprises
 internally adding a compound having lyotropic degree
 as defined in Claim 10 of not less than 4% before or in
 papermaking step into pulp slurry to provide at least two of
 20 any ones selected from the (1) to (3) as defined in Claim 10
 to the pulp sheet.

12, A modified pulp sheet which satisfies at least
 two of any ones selected from (1) to (3) as defined in Claim

10, obtained by internally adding the compound having lyotropic degree defined in Claim 10 of not less than 4% into pulp slurry before or in papermaking step.

- 5 13, Use, as paper quality improver for papermaking, of the compound having lyotropic degree as defined in Claim 1 of not less than 4% and which satisfies at least two of any selected from (i) to (iii) as defined in Claim 1.

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~~least two of any ones selected from (1) improved bulky value~~
~~of not less than 0.02 g/cm³, (2) improved brightness of not~~
~~less than 0.5 point and (3) improved opacity of not less than~~
~~0.5 point. Further, the present invention is use, as a dry~~
~~efficiency improver, of a compound being led to have not less~~
~~than 4% of lyotropic degree measured by a specific method and~~
~~satisfying at least one selected from (i) standard improved~~
~~bulky value of not less than 0.02 g/cm³, (ii) standard improved~~
~~brightness of not less than 0.5 point and (iii) standard~~
~~improved opacity of not less than 0.5 point.~~